

Microorganisms and the USDFRC

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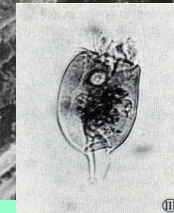
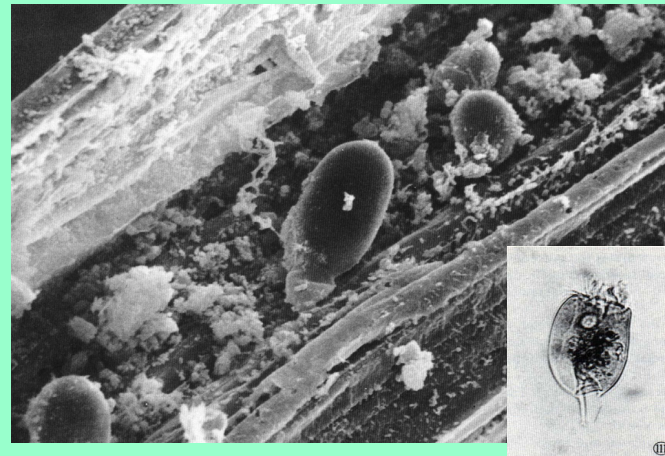
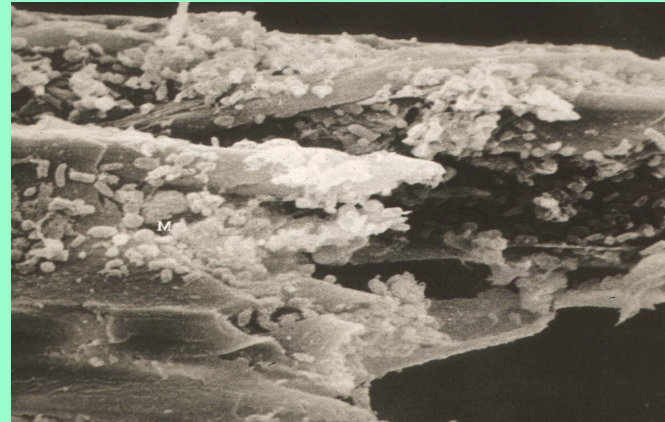
Microbes play a positive key role in many facets of dairy cattle production

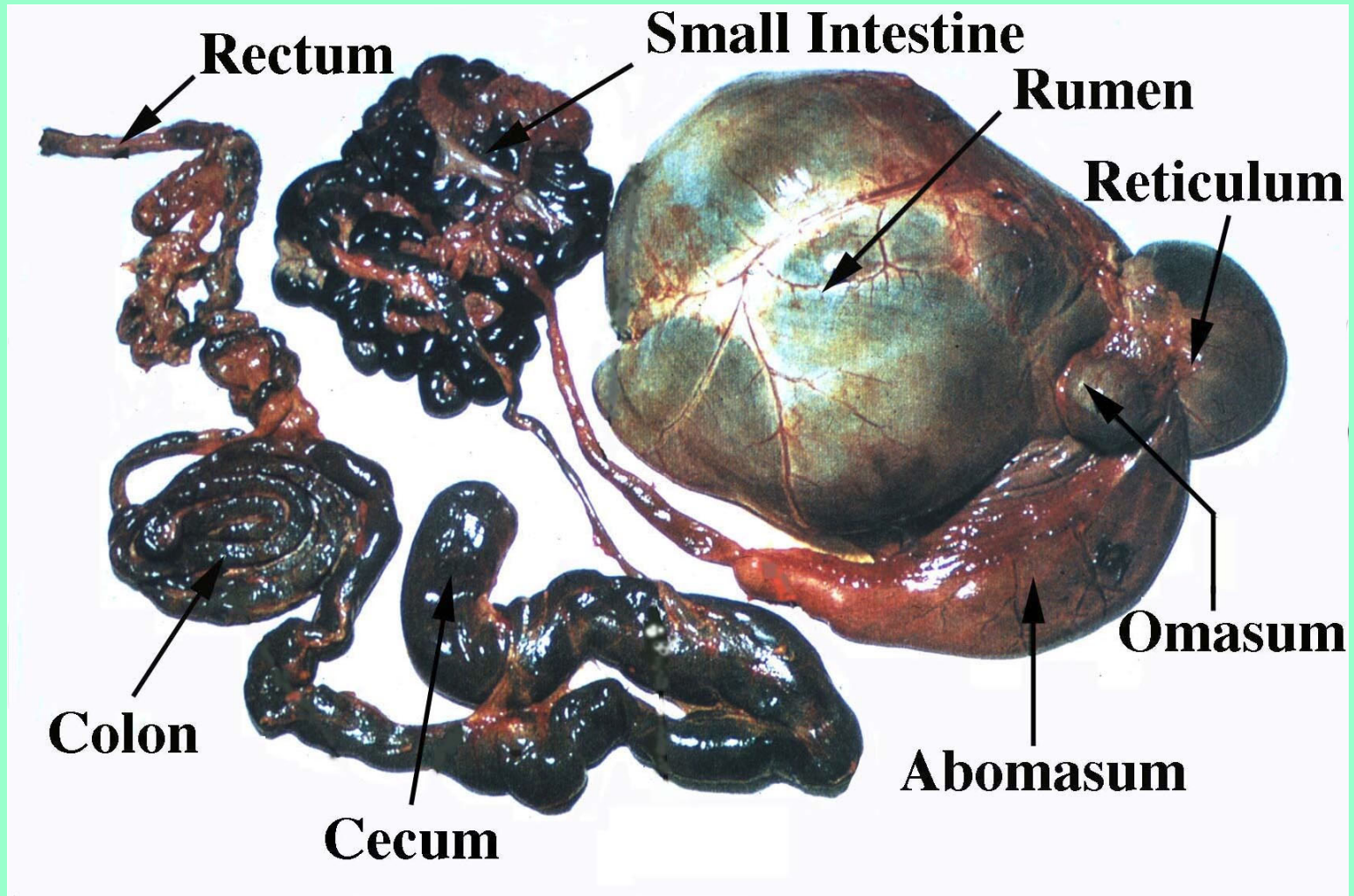
- Soil microbes degrade organic matter, fix nitrogen and improve soil fertility
- Silage bacteria produce organic acids that preserve ensiled forage crops
- Rumen microbes degrade the feed that cattle consume and supply the animal with energy, protein, vitamins, etc.

Sometimes microbes can cause problems

- Bacteria degrade forage protein, and this degradation increases nitrogen loss and pollution
- Some microbes can cause digestive upsets and even death of the cow
- Microbes from manure can contaminate water supplies

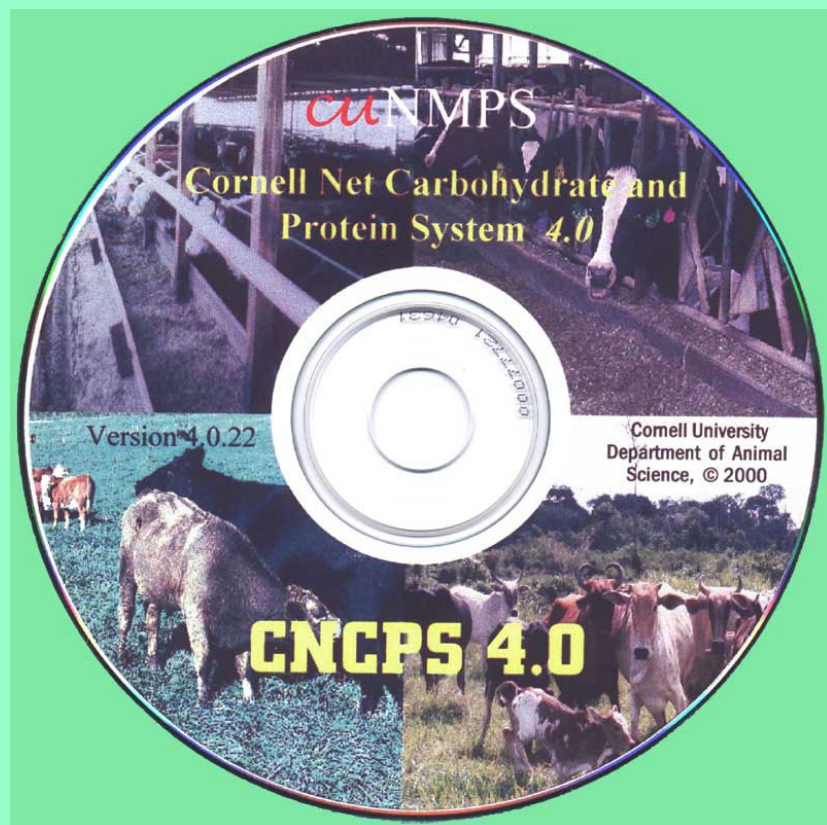
Cattle evolved as grazing herbivores and microbes allowed them to ferment fiber that would otherwise be undigested





Feed ⇒ Rumen ⇒ Microbes ⇒ Acids, Protein, Vitamins ⇒ Cow

Cattle can digest forage fiber,
but forages alone cannot sustain high levels of production



Medium Bloom Alfalfa Haylage (50 lb/day)

17% crude protein, 46% neutral detergent fiber

Energy Allowable Milk 50.4 lbs/day

Protein Allowable Milk 35.4 lbs/day

Rumen N Balance +195 g/day

Haylage (25 lb/day), Corn (25 lb/day), SBM (5 lb/day)

15% crude protein, 22 % neutral detergent fiber

Energy Allowable Milk 91.8 lbs/day

Protein Allowable Milk 78.6 lbs/day

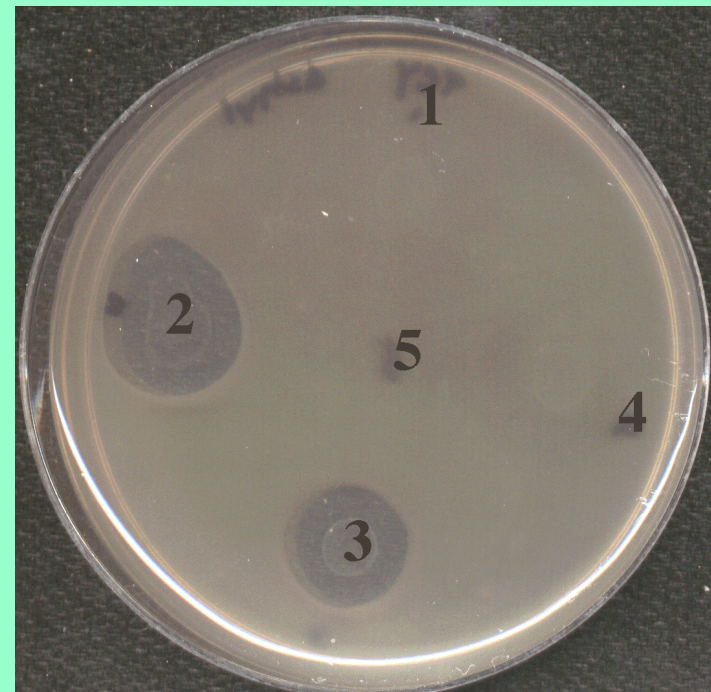
Rumen N Balance +89 g/day

Some ruminal bacteria waste the amino acids from forages and produce excess ammonia

Clostridium aminophilum

Clostridium sticklandii

Peptostreptococcus anaerobius

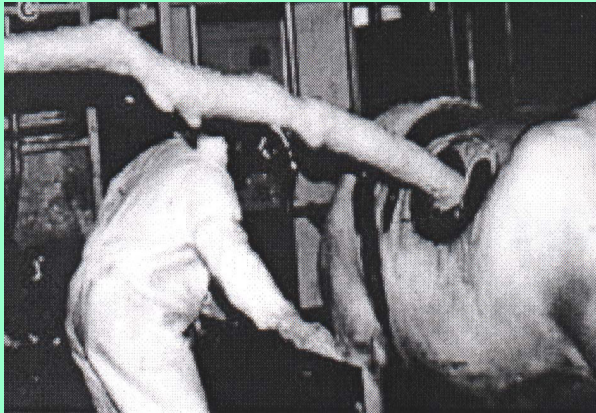


So why not forget about the forage?

- Forages can be produced on dairy farms and often on land that is not suitable for row crops (e.g. erosion).
- The cow has a physiology that is based on fiber, and she needs fiber so she can ruminate, eructate, and absorb fermentation acids efficiently.
- The cow is deficient in pancreatic amylase and does not digest starch as well as pigs and chickens.

Cattle fed fiber-deficient diets suffer from a variety of maladies:

Gas accumulation and bloat



Ruminal acidosis and ulcers

